# INTERMEDIATE ALGEBRA
# REVIEW FOR TEST 1

**Write the set using the roster method.**

1) a) $\{x \mid x$ is a counting number less than $7\}$
   b) $\{x \mid x$ is a whole number between 4 and $8\}$

**Let A = {0, 2, 4, 6, 8, 10}, B = {0, 3, 6, 9}, C = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}, and D = {0, 4, 8}. Answer True or False to the statement.**

2) a) $A \subseteq C$ b) $\emptyset \subseteq A$
   c) $C \subseteq B$ d) $D \subset D$

**Fill in the blank with the appropriate symbol, $\in$ or $\notin$.**

3) a) $-9$ _____ $\{x \mid x$ is an integer$\}$
   b) 0 _____ $\{2, 4, 6, \ldots\}$

**List all the elements of B that belong to the given set.**

4) $B = \{17, \sqrt{8}, -10, 0, \frac{2}{3}, \sqrt{4}, 0.62, -8\pi, 0.444\ldots\ldots\}$

   a) Whole numbers
   b) Integers
   c) Rational numbers
   d) Irrational numbers
   e) Real numbers

**Evaluate the expression.**

5) a) $|5.3|$ b) $|-22|$
   c) $|0|$ d) $\left|-\frac{11}{10}\right|$
   e) $-|-19|$

**Perform the indicated operation.**

6) a) $13 - (-10)$
   b) $-4.0 + (-21.6)$
   c) $-8.5 - 14.6$

7) a) $|-48| + 19$
   b) $|-12 - 15|$
   c) $|2.7 - 8.1|$

**Use the Reduction Property to simplify the expression.**

8) a) $\frac{35}{56}$ b) $\frac{4 \cdot z}{12}$

**Perform the indicated operation.**

9) a) $\frac{1}{9} - \left(-\frac{5}{9}\right)$
   b) $-\frac{2}{3} - \frac{1}{2}$
   c) $-\frac{4}{5} - \left(-\frac{7}{10}\right)$

10) a) $\left|-\frac{5}{8}\right| \cdot \left|-\frac{3}{7}\right|$ b) $\left|-\frac{5}{6}\right| \div (-5)$

**Use the Distributive Property to remove the parentheses.**

11) $\frac{1}{4}(12x - 8)$

12) $(6x + 9) \cdot 4$

**Evaluate the expression.**

13) $\frac{|5(-4)| - |1 - 11|}{-96}$

14) $24 - [7 - (4 - 10)] + (4 - 6)^3$

15) $\frac{6 + (-3)^2 + 7 \cdot 4}{7 \cdot (5 - 3)}$

16) $\frac{|2 - 4^3| - 5}{1 + 2}$

**Express the English phrase using an algebraic expression.**

17) a) The sum of a number y and 97
   b) The product of 8 and a number x
   c) 4 less than 7 times a number z
   d) The product of $-36$ and the sum of a number and 11
   e) The quotient of 21 times a number x and $-8$

**Evaluate the expression for the given value of the variable.**

18) $4x + 2$ for $x = -5$

19) $5(x + 6) + 6$ for $x = -10$

20) $z^2 - 3z + 3$ for $z = 4$

21) $-2x^2 + 3x + 7$ for $x = -3$

22) $\dfrac{x^2 - 10x + 5}{x^2 + 2x - 1}$ for $x = -5$

23) $|7 + 9y|$ for $y = -\dfrac{8}{3}$

24) If a rock falls from a height of 30 meters above the ground, the height H (in meters) after x seconds is approximately $H = 30 - 4.9x^2$. Evaluate the expression for $x = 2$ seconds. (Round your answer to the nearest tenth.)

**Simplify the algebraic expression by combining like terms.**

25) a) $9x + 3 - 4x + 5$

b) $\dfrac{2}{3}x - \dfrac{1}{4}x + \dfrac{1}{12}x$

c) $10(y + 8) - 3$

d) $-7(10r + 10) + 6(2r + 7)$

e) $5[-8x^2 - 9(-3 - x)]$

**Determine which of the given numbers are in the domain of the variable.**

26) $\dfrac{13}{x - 3}$; $x = -3, x = 0, x = 3, x = 13$

27) $\dfrac{x}{x^2 - 6x}$; $x = -6, x = 0, x = 1, x = 6$

28) $\dfrac{x + 5}{x^2 + 14x + 45}$; $x = -9, x = -5, x = 0, x = 9$

**Determine if the number is a solution to the equation.**

29) $4m - 2 = -3m - 39$, $m = -5$

30) $3(x - 1) - x = 4x + 3$; $x = -3$

**Solve the equation.**

31) $3x - 6 = 12$

32) $x - 9.9 = -10.4$

33) $8x + 12 = 2x + 48$

34) $5(y - 6) = 7y - 30$

35) $-2(k - 4) - (-3k + 7) = 2$

36) $-27.5 - 3x = 1.3$

**Solve the equation.**

37) $\dfrac{x}{6} - \dfrac{x}{8} = 9$

38) $\dfrac{x + 4}{4} - \dfrac{3x - 12}{10} = 1$

**Identify each equation as being an identity, contradiction, or conditional equation.**

39) a) $-5(x + 3) - 8 = 2x - 7(x + 5)$

b) $-3x + 7(3x - 5) = -13 - 4x$

c) $24x + 13(x + 1) = 37(x + 1) - 24$

**Solve the problem.**

40) Six times some number added to 4 is equivalent to –23 added to the product of 3 and the number.

41) Robin is having her yard landscaped. She obtained an estimate from two landscaping companies. Company A gave an estimate of $220 for materials and equipment rental plus $50 per hour for labor. Company B gave and estimate of $260 for materials and equipment rental plus $40 per hour for labor. Determine how many hours of labor will be required for the two companies to cost the same.

42) Inclusive of a 6.9% sales tax, a diamond ring sold for $2458.70. Find the price of the ring before the tax was added. (Round to the nearest cent, if necessary.)

43) Employment statistics show that 23,240 of the residents of Bear Valley were unemployed last month. This was a decrease of 17% from the previous month. How many residents were unemployed in the previous month?

44) Nancy invested $600 at a simple interest rate of 9% for 4 years. How much interest did she earn?

**Write an algebraic equation and use it to solve the problem.**

45) Don James wants to invest $69,000 to earn $6650 per year. He can invest in B–rated bonds paying 14% per year or in a Certificate of Deposit (CD) paying 7% per year. How much money should be invested in each to realize exactly $6650 in interest per year?

46) A beverage wholesaler wants to create a new punch. He will mix fruit juice worth $5 a gallon and rum worth $10 a gallon. He wants to obtain 130 gallons worth of punch worth $7 a gallon. How much of each beverage should he use?

47) A chemist needs 140 milliliters of a 46% solution but has only 10% and 66% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.

48) A freight train leaves a station traveling at 32 km/h. Two hours later, a passenger train leaves the same station traveling in the same direction at 52 km/h. How long does it takes the passenger train to catch up to the freight train?

49) A canoe and a motorboat travel toward each other from a distance of 70 miles. The motorboat travels 12 miles per hour faster than the canoe. The two boats pass each other after 2.5 hours. How fast does each boat move?

**Solve for y.**

50) $2x - 5y = 7$

51) $A = \frac{1}{2}bh$ for b

52) $A = P + Prt$ for P

53) $aw = b^2w - cx$ for w

**Solve.**

54) The formula for the perimeter of a rectangle is $P = 2L + 2W$. Solve the formula for L. Use this formula to find the length of the rectangle if the perimeter, P, is 34 feet and the width, W, is 9 feet.

55) The surface area S of a right circular cylinder is given by the formula $S = 2\pi rh + 2\pi r^2$, where r is the radius and h is the height.
a) Solve the formula for h.
b) Determine the height of a cylinder whose surface are is $72\pi$ square centimeters and whose radius is 4 centimeters.

Answer Key
Testname: IAREVIEW1F10

1) a) {1, 2, 3, 4, 5, 6}
   b) {5, 6, 7}
2) a) True b) True
   c) False d) False
3) a) $\in$ b) $\notin$
4) a) $\{17, 0, \sqrt{4}\}$
   b) $\{17, -10, 0, \sqrt{4}\}$
   c) $\left\{17, -10, 0, \frac{2}{3}, \sqrt{4}, 0.62, 0.444...\right\}$
   d) $\{-8\pi\}$
   e) $\{17, \sqrt{8}, -10, 0, \frac{2}{3}, \sqrt{4}, 0.62, -8\pi, 0.444.....\}$
5) a) 5.3 b) 22
   c) 0 d) $\frac{11}{10}$
   e) –19
6) a) 23 b) –25.6 c) –23.1
7) a) 67 b) 27 c) 5.4
8) a) $\frac{5}{8}$ b) $\frac{z}{3}$
9) a) $\frac{2}{3}$ b) $-\frac{7}{6}$ c) $-\frac{1}{10}$
10) a) $\frac{15}{56}$ b) $-\frac{1}{6}$
11) 3x – 2
12) 24x + 36
13) $-\frac{5}{48}$
14) 3
15) $\frac{43}{14}$
16) 19
17) a) 97 + y or y + 97
   b) 8x
   c) 7z – 4
   d) –36(x + 11)
   e) $\frac{21x}{-8}$
18) –18
19) –14
20) 7
21) –20
22) $\frac{40}{7}$
23) 17
24) 10.4 meters
25) a) 5x + 8
   b) $\frac{1}{2}x$
   c) 10y + 77
   d) –58r – 28
   e) $-40x^2 + 45x + 135$
26) x = –3, x = 0, x = 13
27) x = –6, x = 1
28) x = 0, x = 9
29) No
30) Yes
31) 6
32) –0.5
33) 6
34) 0
35) 1
36) {–9.6}
37) 216
38) 24
39) a) Contradiction
   b) Conditional equation
   c) Identity
40) –9
41) 4 hours
42) $2300
43) 28,000
44) $216
45) $26,000 in B–rated bonds and $43,000 in a CD
46) He should mix 78 gallons of juice with 52 gallons of rum.
47) 50 mL of 10%; 90 mL of 66%
48) 3.2 hours
49) canoe: 8 mph
   motorboat: 20 mph
50) $y = \frac{2x - 7}{5}$
51) $b = \frac{2A}{h}$
52) $P = \frac{A}{1 + rt}$
53) $w = \frac{-cx}{a - b^2}$
54) L = 8 feet
55) a) $h = \frac{S - 2\pi r^2}{2\pi r}$
   b) 5 centimeters